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portions. In electrolyzing this liquid the anode plates are carbon, platinum, or some other substance not acted on by the acid: the cathode plates are zinc, carbon, etc. To keep the saturation constant, and to prevent polarization from an excess of free acid, Mr. Watt has devised a system of circulation by which the used-up liquid is restored to its original density in special reservoirs, and is used over and over again. In the treatment of blende or native sulphate of zinc, the ores are first roasted, after which they are pulverized and put in acid, as has been described. The process is said to be more economical than those now in use, but it has not been tested by experiment on a large scale.

ELECTRIC TESTING BUREAU AT JOHNS HOPKINS UNIVERSITY.—In a circular that has just been issued by the Johns Hopkins University is the announcement that an electric testing bureau is to be opened from Sept. 1. The circular, besides the announcement, gives the general methods of measurement that are to be employed. Such a bureau has been needed for some years. With the rapid increase in the number and importance of the applications of electricity in this country, the necessity of more accurate methods of measurement has become more and more apparent. In order that such measurements shall be uniform and comparable, they must be in terms of the same standards, and these standards should be referred to the system of absolute units, whose adoption has been of such benefit to physical science. The instruments in use for commercial measurements have constants that are liable to change in time; and electrical resistances, especially those used in accurate researches, should be carefully compared with standards. But besides the comparison of instruments and resistances, tests of batteries, dynamos, motors, etc., are to be made. This is an especially valuable feature, for almost every day brings the invention of some new storage or primary battery, dynamo, or motor, and it is not often that the inventor is in position to accurately test the value of his invention. For those who wish to develop any new discovery, it would be well to have some place of reference, where its value and possibilities can be impartially determined. The establishment of similar bureaus in France, Germany, Austria, and England has called attention to the necessity of something of the kind here. The applications of electricity in this country are much more important and extended than in any other, and it is to be hoped that this new departure will aid in their development. The Johns Hopkins University seems especially fitted to undertake the work; for, besides the excellent equipment of the laboratories, the institution has been more or less identified with accurate measurements since the classical determination of the mechanical equivalent of heat, made in 1878 by Professor Rowland. More lately important experiments have been made on the determination of the ohm, and the specific resistance of mercury. The list of prices given in the circular is reasonable, and the bureau should be well patronized.

HEALTH MATTERS.

Malaria.

THE subject of malaria and its causation was thoroughly discussed at the last meeting of the American Medical Association. One of the contributions was from the pen of Dr. Henry B. Baker. His conclusions were as follows: 1. Intermittent fever is proportional, directly or inversely, to the average daily range of atmospheric temperature. 2. The controlling cause of intermittent fever is exposure to insidious changes in the atmospheric temperature. 3. In the mechanism of the causation of intermittent fever the chief factor is the delay in the re-action to exposure to cool air: this delay, extending to a time when greater heat loss should occur, results in the abnormal accumulation of heat in the interior of the body and in disturbed nervous action,—the chill; and the final re-action is excessive, because of the accumulation of heat, and sometimes because it occurs at the warmest part of the day. 4. The fever is the excessive re-action from the insidious influence of the exposure to cool air; and it is periodical because of the periodicity of nervous action, and because the exposure and the consequent chill are periodical, owing to the absence of the warmth

from the sun at night. 5. Residence in valleys or on lowlands through which or upon which cold air flows at night, and thus causes insidious changes in the atmospheric temperature, favors intermittent fever. 6. In our climate those measures, such as drainage, which enable the soil to retain warmth during the night, and thus reduce the daily range of temperature immediately over such soil, tend to decrease intermittent fever among residents thereon. 7. In the cure and prophylaxis of intermittent fever, those remedies are useful which lessen torpidity (especially of the liver) and tend to increase the power of the body to re-act promptly to insidious changes in atmospheric temperature.

A paper entitled 'Malaria and the Causation of Fever in the State of New York' was presented by Dr. A. N. Bell of Brooklyn. As a result of his observation and study, he concludes that malaria is coincident with accumulations of organic matter in process of putrefaction in alluvial bottoms, on the margins of sluggish streams, low humid borders of stagnant ponds and lakes, the marshy borders of the seashore, and circumscribed local conditions, chiefly artificial, comprehending more or less the same relations to vegetable *débris* and other organic matter in process of decay as the outlying conditions mentioned in this connection. While it is not possible in the present state of our knowledge to determine the special relations existing between malarial diseases and the geological, thermal, hygrometrical, and barometrical conditions under which they occur, those thermal and hygrometrical conditions most promotive of putrefaction coincident with the absence of sunlight are in the highest degree promotive of malarial poison.

Prof. Tommasi Crudeli sent a letter to the association, expressing the opinion that it was impossible for a person to have ague without the presence in his body of the *bacillus malarie*. Dr. Bernardo Schiavuzzi of Pola, in a written communication, expressed himself a believer in this bacillus, and supported his belief by a statement of experiments on rabbits. Professor Laveran sent a paper on the *hematozoon malarie*.

CANCER.—The fatal result which almost inevitably attends cancer has caused investigators to search with unremitting zeal for a specific. This search is now prosecuted with more hopefulness than ever, by reason of the belief in many minds that cancer is a specific disease depending on a germ for its causation. One of the remedies from which much was expected was Chian turpentine. Although this has had its advocates in the past, it has never sustained a very high place in the profession generally. Recently it has again come into favor, principally through the reported cures occurring in the practice of Professor John Clay, obstetric surgeon to the Queen's Hospital, Birmingham, England. In these reports are included cases of cancer of the uterus, rectum, and skin. At the same time a trial of the remedy at the London Cancer Hospital has been made, with conflicting results. Dr. Daniel Lewis, surgeon to the New York Skin and Cancer Hospital, reports hopefully of the remedy, but in a communication to the *New York Medical Journal* says that he has been using it in too limited a number of cases to decide as to its curative properties. Chian turpentine is the product of a tree, the *Pistacia terebinthus*, which grows on the island of Scio in the Mediterranean. The turpentine, as it comes to this country, is a soft solid, becoming brittle when exposed to the air. It has an agreeable odor, somewhat like that of turpentine, and very little taste. The remedy is given in the form of an emulsion with mucilage of acacia, a solution of the turpentine having first been made with sulphuric ether.

TYPHOID FEVER.—The Paris correspondent of the *New York Medical Journal* reports that Professor Proust, who holds the chair of hygiene at the faculty of medicine there, has been giving a series of lectures on epidemics of typhoid fever and other diseases provoked by the ingestion of meat from diseased animals. One of the most important questions raised is that of whether it has been established that typhoid fever is a specific malady, caused by a certain organism called Eberth's bacillus. In Paris this doctrine has for the most part been accepted since the late studies made by Professor Brouardel and Dr. Chantemesse, who showed that this bacillus could be traced to the water-supply. It will be remembered, however, that Murchison held that the typhoid contagium could be developed in any putrid matter, and by this theory it is

easy to explain how meat could be infected by the typhoid element ; but if we accept the bacillus as the sole specific cause, and reject the pythogenic theory, which attributes the generation of the contagium to the fermentation of faecal matters independently of any specific germ, we must prove that these epidemics were caused by meat containing the bacillus first seen by Klebs and then by Eberth, and lately found in the living body by Chantemesse and Widal in Paris. But this is far from proved. Chauveau and No-card, who are among the most celebrated of French physiologists occupied with the study of animals, state that they do not believe in the existence of typhoid fever in animals. Walder, however, while making an autopsy of a heifer during the epidemic at Kloten, saw that the animal had tumefaction and softening of the mesenteric ganglia and of Peyer's patches, the latter presenting signs of ulceration. A second animal examined presented the same lesions, and both belonged to a farmer who had the fever himself. It was thought, however, that these animals had had access to matters coming from the family who were ill with the fever, and also to matters coming from autopsies made on other animals. In any case, Walder sought to prove that animals could take typhoid fever. The modern progress of bacteriological study will allow us to prove the existence of Eberth's bacillus in man, as well as in animals, in case of an epidemic ; but quite recent observations seem to show that different bacilli may produce typhoid states in both man and animals, so that the question is not as yet settled. There have been five well-known epidemics where typhoid symptoms resulted from the ingestion of meat in Switzerland since 1839, when it commenced at Andelfingen, up to Kloten in 1878, and Würenlos and Spreitenbach in 1880-81. In the first, some 450 persons were attacked, and over 700 at Kloten. Both of these epidemics followed great dinners given by musical societies, and the meat eaten was veal. The symptoms were those of typhoid fever, with the usual thermometric rise and fall so well described by Wunderlich. The autopsies made showed also the usual signs found after typhoid fever. The matter is important enough to make us insist on the fullest examination of all meat exposed for sale.

A SIMPLE FILTER.—Dr. F. A. Castle of New York thus describes, in a letter to the *New York Medical Journal*, a simple, and, as he claims, efficient filter: "For a long time I have used in my butler's pantry a simple contrivance for filtering water used on the table, which has been so serviceable, and at the same time so inexpensive, that I venture to recommend it. I took an ordinary glass pharmaceutical percolator, and packed the outlet with absorbent cotton so tightly that the water could only flow in drops. By means of a piece of copper wire for a bale, it was suspended from a hook on the lower side of one of the pantry shelves, over the shelf of the sink. As often as necessary, water is poured into the percolator, and the water-pitcher is placed under the outlet. Whenever the cotton shows much discoloration, — a thing which is easily observed, owing to the percolator being of glass, — the maid replaces it with fresh absorbent cotton. It is in all respects the most practical and cheapest filter I know of, and has no machinery to get out of order, no patent right to carry, and the advantage over most filters that the filtering medium is always under observation, so that there is little risk of contamination of the water by accumulations of filth."

PRECAUTIONS IN BATHING.—We have already called attention in *Science* to the danger of injury to the ear in bathing as described by Dr. Samuel Sexton. The London *Lancet*, in the following language, directs attention to still another danger. The bathing season, though not yet advanced, has already been marked by the levy of that fatal tribute which year by year is exacted of the ignorant and the indiscreet. The recent death by drowning of a young man in the public baths at Poplar suggests one cause of accident which is too apt to be overlooked. The deceased had entered the water soon after partaking of a hearty meal, and the fatal result was attributed to cerebral congestion due to sudden immersion at such a time. What may have been the particular appearances observed after death in this case we have no means of judging, but it may be well to consider shortly some reasons why the practice of bathing soon after meals is justly condemned. Effusion of blood in or upon the brain, when it occurs in such cases as that

already referred to, is probably not a primary cause of mischief, but rather a consequence founded on other circulatory and nervous disturbances. It is an evidence of eclampsia, and the physiological basis upon which this is founded consists in that inward diversion of blood toward the alimentary tract which characterizes normal digestion ; the other tissues, notably the brain, being at the same time proportionally anæmic, and the action of heart and lungs impeded by a distended stomach. A natural result of cold immersion at this stage is to encourage or induce a tendency to syncope, to concentrate surface blood still more about the central organs, including the heart, which, especially if at all unequal to its duties, labors ineffectually to re-adjust the blood-pressure, and finally succumbs with lungs and venous system engorged by passive congestion. It is as if an enemy occupied the outworks of a fortress left for a time unguarded, and forthwith paralyzed the resistance of the citadel. It is best, therefore, to wait for at least an hour and a half or two hours after a good meal before bathing. Another danger to be avoided is that of cramp. This is particularly apt to occur after severe exercise or long immersion. The effect of cold being to prolong the contraction, while exhaustion lowers both the power and the elastic recoil of muscle, it is evident that we have in a combination of these forces all that is required for the production of this dangerous condition. The obvious warning implied in these remarks requires no further admonition to impress the fact that the bather in cold water must be economical of time, and free from any appreciable signs of muscular exhaustion.

THE TUNING-FORK IN THE DIAGNOSIS OF EAR AFFECTIONS.—Dr. O. D. Pomeroy of New York, in a paper read before the Medical Society of the State of New York at its last annual meeting, discussed the use of the tuning-fork in the differential diagnosis of ear affections. The fork which he employs is of large size, being eight inches in length. It has thick prongs, and gives a strong vibration. Its pitch is A of the middle tenor register, and it vibrates something over four hundred to the second. He finds that the absolute or total bone-conduction, with the fork placed on the mastoid of a closed normal ear, is as great as can be found in any case of middle-ear disease, and greater than when disease of the labyrinth is present. There are several difficulties in the way of obtaining a reliable test for bone-conduction. One is the inability of many patients to distinguish between vibrations which are felt and those which are heard. Any part of the body susceptible of vibrating in unison with a tuning-fork of a given pitch will feel the vibration without having heard it. Few people who have heard a pipe-organ will fail to remember, that, when some of the lower notes are sounded, a rumbling or a jarring sensation in some part of the body is experienced, which, of course, is not a matter of acoustic irritation, but one of general sensation. In one case of a patient who had suffered from meningitis, which left her totally deaf, when the tuning-fork was applied to the elbow she insisted that she heard it distinctly. Dr. Pomeroy gives the following summary as the result of his study of the subject: "I conclude that the greatest amount of bone-conduction proceeds from a normal ear closed, and that the principal diagnostic sign of labyrinthine disease appears in weakened bone-conduction ; that the apparent increase of bone-conduction in middle-ear disease will disappear when the test is made with the ear closed, when it will be found not to exceed that of the normal ear (in those cases called 'mixed' the bone-conduction will be found weakened when the test is made with the ear closed, although with both ears open the affected one may have better bone-conduction than its fellow) ; that, so far, it seems that the good or bad condition of the middle-ear mechanism has little influence on bone-conduction ; that the occasional phenomenon of intermittent bone-conduction cannot be satisfactorily explained ; that cases of pure labyrinthine disease cannot always be distinguished from those of middle-ear affections with secondary labyrinthine changes by the tuning-fork, and that the history of the cases must materially aid us in the distinction ; that the phenomenon of secondary labyrinthine changes in middle-ear diseases is easily explainable ; that there are numerous exceptions to the rules for finding the best points on the head for eliciting bone-conduction ; that the bone-conduction is rarely or never of less than its proper ratio to aerial conduction."